المستوى الثانى
فيزياء
تفاضل عالى
ر ٢٠٥

المستوى الثانى المادة: تفاضل عالى ر ٢٠٥ الشعبة: فيزياء	كلية العلوم - قسم الرياضيات	دور: يناير ٢٠١٢ الزمن: ساعتان التاريخ: ١٨/ ١ /٢٠١٢

أجب عن الأسئلة الآتية: الدرجة الكلية ٨٠ درجة

السؤال الاول : (٢٠ درجة)

أ) إدرس اتصال الدالة الآتية عند النقطة $(0,0)$

$$f(x,y)=\begin{cases}\dfrac{2xy}{x^2+y^2} & , \quad (x,y)\neq(0,0)\\ 0 & , \quad (x,y)=(0,0)\end{cases}$$

ب) إذا كانت $u=\ell n\left(\dfrac{x^2+y^2}{x+y}\right)$ فأثبت باستخدام نظرية أويلر للدوال المتجانسة أن

$$xu_x+yu_y=1$$

السؤال الثانى : (٢٠ درجة)

أ) أوجد قانون اختزال للتكامل $I_n=\int x^n e^{ax}dx$ واستخدمه لإيجاد $\int x^4e^{2x}dx$

ب) احسب قيمة التكامل $\iint_R \sqrt{x^2+y^2}\,dxdy$ حيث R هى المنطقة المحصورة بين الدائرتين $x^2+y^2=9$ & $x^2+y^2=16$.

السؤال الثالث : (٢٠ درجة)

أ) أكتب مفكوك تيلور للدالة $f(x,y)=e^x\cos y$ حول نقطة الأصل وذلك بأخذ $n=2$ واحسب كذلك باقى لاجرانج للدالة فى هذه الحالة.

ب) أوجد القيم العظمى والصغرى النسبية للدالة $f(x,y)=3x^3+3x^2y-y^3-15x$

السؤال الرابع : (٢٠ درجة)

أ) أوجد قيمة التكامل الخطى $\int_c xydx+x^2dy$ حيث c هى القطعة المستقيمة بين النقطتين $(2,1)$ & $(4,5)$.

ب) حقق نظرية جرين للتكامل

$$\oint_c (2xy-x^2)dx+(x+y^2)dy$$

حيث c هو المنحنى المغلق للمنطقة المحدودة بالمنحنيات $x=y^2$ & $y=x^2$

مع اطيب الامنيات بالنجاح والتوفيق

د/ محاسن احمد

فيزياء المرونة
المستوى الثانى - فيزياء - (ف ٢١٥)
فيزياء المرونة

Mansoura University Faculty of Science Physics Department Course Title: Elasticity Date: 26-12-2011		Jan. 2012 Exam Type: Final Second Level : (Physics) Time: 2 Hours Full Mark: 80 Mark

Answer the following questions:

1- a- Compared between elastic behavior and viscoelastic behavior? [10 Mark]

b- Write briefly on the following: - [15 Mark]

1) Stress- Fatige- Elasticity- Strain

2- a- What is the meant by creep? [3 Mark]

Mention the types of creep? [7 Mark]

b- Write on the following: - [15 Mark]

Dynamic modulus- Effects of temperature on

Viscoelastic behaviour- Deformation

3- a- Explain the factors affecting on the fatigue life. [10 Mark]

b- Write on the following:-

1) Elastic moduli- Fracture – Stages of creep [15 Mark]

2) Discuss Stress- Strain curve [5 Mark]

With best wishes

Examiners

أ.د. محمود أحمد أبوزيد أ.د. أبوبكر البديوى د.عادل داود

Mansoura University Faculty of Science Physics Department		First Term Exam. Jan 2nd Level, Physics Date: Jan. 2012 Time : 2 hours
Classical Mechanics (214 Phys.)		Full Mark : 80 Marks

Answer the following Questions:

1-a) Drive the equation of motion for a moving particle in a central field.

b) Show that $r\dot{\theta}$ is a constant, and what does it mean?

c) If r = 1/u, drive the differential equation for the path and discuss the paths when the total energy E > 0, E = 0, E < 0. [20 Mark]

2. a) Find the total angular momentum and total kinetic energy of a system of particles about any point O.

2.b) Determine the number of degree of freedom when

(i) A particle moving on space curve.

(ii) Five particles moving freely in a plane.

(iii) Two particles connected by a rigid rod moving in a plane. [20 Mark]

3.a) Give an example to show that finite rotations cannot be represented by vectors.

b) Find the moment of inertia of a right circular cone of height h and radius R about its axis. [20 Mark]

4.a) Describe the coordinate *surfaces* and coordinate *curves* for both cylindrical and spherical coordinates.

b) Drive $\nabla\Phi$ and $\nabla\cdot A$ in orthogonal curve linear coordinates. [20 Mark]

With Best wishes

Prof.Dr.Essam Abulwafa Prof.Dr. A.M.Elhanbaly Dr. H. Ibrahiem

University of Mansoura Faculty of Science Physics Department Subject: Physics		First Term Sophomore Students Date :January 2012 Time allowed : 2 hours
Course (s): Phys 213		**Full Mark : 80 Mark**

Answer The Following Quest11

1) Discuss the characteristics of beta –ray spectra. Apply the conservation laws of energy, linear momentum and angular momentum, assuming the decay is two body problem . Show how to overcome the difficulties found. (20 marks)

2) Define the following :

I) Isobars ii) Packing fraction

iii) The curie iv)Electron capture

v) mass defect vi) Radiation length

vii) Types of radiation equilibrium viii) Lipton particles and its conservation law. (20 marks)

3) Derive expressions for the coulomb effect and surface tension effect for the nuclei, construct the semiempirical atomic mass formula. (20 Marks)

4) Discuss the following :

a) Internal conversion b) Compton effect

c) Nuclear isomerism d) Pair production

e) The Auger effect (20 Marks)

Examiner : Prof.Dr.M.A.Abouzeid

Mansoura University **Faculty of Science** **Physics Department** **Subject: Physics**		**First Term** **Credit hours Students: Physics** **Date : January 2012** **Time allowed : 2 hours**
Course: Physics ٢١٢, Meteorology & Astronomy		**Full Mark : 80 Mark**

Answer the 1st question then any other two questions

[1] a- Derive the potential differential equation for the motion of a body in a field of a central force . [10] Marks

b- A body moves under the effect of central force in an orbit of radius is given by $r = 3a \sin\theta$, determine:

i- The potential energy V(r), [12] Marks

ii- Using the above equation determine the force F(r). [3] Marks

c- Calculate the periodic time for rotation of Mercury plant, if the average distance between the planet and the sun is 58.05×10^6 Km.
$[G = 6.67 \times 10^{-11}\ N\ m^2\ Kgm^{-2}, M = 2.0086 \times 10^{30}\ Kgm]$ [5] Marks

[2] a- State Kepler's 1st law. [3] Marks

b- Define the Eccentricity. [3] Marks

c- Prove that the cube of the semi major axis is proportional to the square of the periodic time of any planet. [14] Marks

d- The troposphere is unstable layer. Discuss this phrase. [5] Marks

[3] a- For El-Mansoura of latitude 31°N, on 21 December, Calculate: [12] Marks
i-The declination angle. **ii**-The zenith angle, at 9:00 LAT.
iii-The time of sunrise **iv**-The day length.

b-The atmosphere consists of different layers. Discuss this phrase with illustrating the dependence of temperature on altitude. [7] Marks

c- Study the effect of the latitude angle ϕ and the declination angle δ on the sunrise hours at the following conditions:
i- At the equator, ii- At the poles, iii- At the equinoxes. [6] Marks

[4] a- The earth is the only planet in the solar system which has continental lands and oceans. Discuss this phrase. [12] Marks

b- Study the effect of altitude on the density of the atmosphere. Drive the corresponding equations. [13] Marks

Good Luck

Examiners: **1-** Prof. Dr. Magdy Tadros Yacoub* **2-** Dr. Hamed Ibrahem

3- Dr. Bakr Abd El-Latef

المستوى الثانى - فيزياء - ف ٢١١ اهتزازات وموجات
فيزياء عامة

Mansoura University — first Semester

Faculty of Science

Physics Department — Date : jan 2012

Subject : Physics — Time Allowed: 2 hours

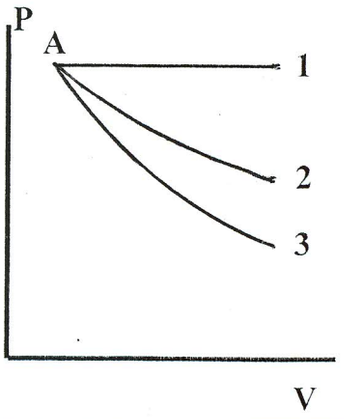
Course(s): code 211 (Waves & vibrations) — Full Mark: 80 Mark

Answer The following questions

[1]	a- Solve the differential equation of damping oscillating waves. b- Find the apparent frequency at a detector for a source of waves moves with velocity U away from the detector.	[15] Mark [12] Mark
[2]	a- Find the energy of 2-dimensioal oscillator. b- Define the transmittance coefficient and prove that it depends on the density per unit length of both parts of the string.	[10]Mark [16]Mark
[3]	A-- A spring is hanged vertically and fixed at the upper end. A mass of 7 Kg is fixed at the other end. The mass is pulled down a distance of 5 cm and left, find i) the maximum amplitude ii) the periodic time iii) the total energy if the spring constant = 700 N/m b-Find the condition to obtain a straight line with negative slope as a resultant of the superposition of two perpendicular waves.	[12]Mark [15] Mark
Examiners Prof. Dr. Mahrous Shaker		

Mansoura University Faculty of Science Physics Department	2nd Year-Physics	First Semester, 2011-2012 January, 2012 Time: 2 Hours
Physics (210)	Thermodynamics	Full Mark : 80 Marks

Answer the following Questions:

1-a)	Find the coefficient of volume expansion β, the compressibility K and the Joule-Kelvin coefficient μ_J of an ideal gas.	*10*
1.b)	One mole of an Ideal gas $C_V = \frac{2}{3}R$ at P_A=1 atom, V_A=1 liter, T_A=127 °c, is taken from point A through the processes [an isobaric (curve 1), an isothermal (curve 2) and an adiabatic (curve 3)] as shown in the Figure. Calculate W, Q, ΔU and ΔS for the three processes if the final volume is equal to 3 V_A . [Note: 1 liter. Atmosphere =1.013 x10^2 Joule , R=8.3 J/mole.degree] 	*20*
2.a)	Describe the Joule experiment and show that the internal energy of an ideal gas is a function of temperature only.	*15*
2.b)	A Carnot engine is operated between two heat reservoirs at temperature 127 °C and 27 °C receives 1200 calories from the hot reservoir in each cycle , calculate: **i)** The amount of heat rejected to the reservoir at 27 °C. **ii)** The work done by the engine.	*10*
3	Using Maxwell's equations deduce the first and second TdS equations and prove that $$C_p - C_V = -T\left(\frac{\partial V}{\partial T}\right)_P^2\left(\frac{\partial P}{\partial V}\right)_T$$ And comment on the result.	*25*

With our Best Wishes

Examiners:	*Dr. Anwar Megahed (*)*	